San Rafael Bridge
Spanning the San Rafael River near Buckhorn Wash
Castle Dale vicinity
Emery County
Utah

HAER No. UT-60

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Rocky Mountain Regional Office
National Park Service
U. S. Department of the Interior
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Denver, Colorado 80225

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HISTORIC AMERICAN ENGINEERING RECORD

San Rafael Bridge

HAER No. UT-60

Location:	Spanning the San Rafael River near Buckhorn Wash, approximately 22 miles southeast of Castle Dale, Emery County, Utah UTM: A 12/4325640/528920 B 12/4325620/528910 Quad: Bottleneck Peak, Utah
Date of Construction:	1937
Present Owner:	Emery County Road Commission Emery County, Utah
Present Use:	Vchicular and pedestrian bridge, to be replaced by a new bridge a short distance upstream. The bridge is to be abandoned in situ.
Significance:	The San Rafael Bridge is a single span double intersection Warren suspension bridge and is one of two known bridges of this type in Utah. The bridge was constructed by the Civilian Conservation Corps of wood, steel and concrete.
Historian:	Don Southworth Office of Public Archaeology October 1989

1. HISTORY

A. The CCC and the Bridge

In 1932, at the height of The Great Depression, Franklin Roosevelt was elected president, with the hope that he might lead the nation out of the worst economic slump of its history. A month after assuming office, the new president issued Executive Order 6101, which established the Emergency Conservation Work Program. [1] [2] The Emergency Conservation program was later renamed the Civilian Conservation Corps (CCC). The purpose of this program was to put to work an estimated twelve to sixteen million unemployed men. [3] These men were to be employed on public projects located with state and federal lands. the projects would include transportation improvements, flood control, forestry, soil conservation, irrigation improvements, and recreational development. [4]

Robert Fechner was appointed director of CCC in April 1933 and remained its head until his death in December 1939. [5] He had been a member of the General Executive Board of the International Association of Machinists and vice-president of the American Federation of Labor. [6] Fechner was succeeded by James M. McEntee as director in March 1940. [7]

Four government departments were required to carry out the CCC program -- War, Labor, Agriculture and Interior. The War Department was responsible for the care, feeding and personal supervision of the Corps, while the Labor Department enrolled the men through the individual state welfare agencies. The Agriculture and Interior departments were responsible for the technical administration and supervision of the Corps' projects. [8] [9]

In 1937, a government report described the makeup of a typical CCC camp and those across the nation, as follows:

> Each CCC camp houses 160 enrollees. Camps also house army reserve officers, work supervisors, and technical personnel. In January 1937, there were 2084 CCC camps in operation; 1,500 of which were under the technical supervision of the Department of the Interior. Surveys conducted by the Department of Labor revealed that 75 percent of all young men entering the CCC during the past year were under the age of 21 when enrolled. Out of 93,336 juniors selected in October 1936, 27 percent were 17 years old; 26 percent were 18; and 14 percent were 19 years old. The survey also indicated that about a fifth of these junior 'enrollees' had never held a steady job until their enrollment in the CCC. [10]

From 1933 to 1941, these CCC enrollees completed projects which "included the planting of several million trees, the construction of 118,400 miles of truck trails and minor roads, erection of 85,000 miles of telephone lines, the building of 45,000 bridges, and the construction of over 6,800 large impounding and diversion dams." [11]

The original program limited enlistment "to unemployed single men between eighteen and twenty-five who were members of families on relief rolls." [22] Enlistment quotas were based non population of the individual state, of which Utah's was set at 1,000. The CCC added to this number, 1,300 local, experienced men," to act as project leaders. These leaders were "unemployed carpenters, lumbermen, miners, and others." [13] From the first, the quotas were oversubscribed as the unemployed rushed to fill thee positions. By 1938, there were forty-five percent more citizens of Utah working on CCC projects than the national average. [14]

in Utah, the CCC constructed twenty-six camps of which twenty were in national forests, one in Zion National Park and five on state land. [15] After the first three months of working in the state, the CCC had constructed 12 fire breaks, 24 miles of road, 100 stone dams, 200 miles of surface ditches, planted 25 acres of trees and worked on 779 acres for erosion control. [16] From 1933 to 1942, they had constructed 709 bridges in Utah, of which 231 were foot and horse types, while the remaining 478 were vehicular bridges. [17] The swing bridge across the San Rafael River in Buckhorn Wash was one of these vehicular bridges.

In 1936, the eastern portion of Emery County was a relatively inaccessible region. Except for the rivers and streams that drain through the area on their way to the Colorado River, it was a dry and desolate country. The only people to enter this part of the county were cattle and sheep ranchers and a few oil prospectors. [18] As the emphasis on transportation changed from the horse to the automobile, it became necessary for the region to be accessed by car.

Three bridges had been constructed across the San Rafael River prior to the swing bridge. Because each of these were pier bridges, their support substructures were constructed in the river bed. Later, flash floods would sweep through the dry washes and wash away the bridge support structure. The solution to this flash flooding problem was to construct a suspension-swing bridge type with its support structure located on the river banks. [19]

These bridges were important to the local inhabitants of the area. The sixty-eight ranchers, who lived and worked the range, needed the bridge to get their herds across the river for grazing purposes. [20] Prior to the construction of the swing bridge, a small trolley system was the only means of crossing the river when their was too much water to wade across. [21] The Grazing Administration saw the need for a swing bridge and authorized construction of the San Rafael Bridge.

B. Construction Chronology

In May 23, 1936, the construction of the bridge was announced to the public in the following newspaper article:

> At last the spike camp on Buckhorn Trail is completed. Twenty-nine enrollees, under the supervision of Allen Lowry, are progressing rapidly on the building of the road and have started operations on the suspension bridge that will span the San Rafael River. This bridge is expected to be completed by the first of July. The road is passable for motor travel up to the San Rafael River. [22]

The week after the above announcement appeared in the local newspapers, a more in-depth article discussed the need for the bridge and road, as well as describing its construction:

> The new bridge, upon which work has already started, will be swung on two cables, each two and one-half inches in diameter and more than 250 feet long. Four concrete towers, two on each bank of the San Rafael, will support the cables, which will have their end fastened securely in the solid ground 50 feet from the edge of the stream. The distance between towers will be 160 feet. The bridge will be 14 feet and will permit the passing of two automobiles. The floor will be of heavy planking. The bridge was designed by Mr. Lehmer, aided by W. P. Henock, engineer

> -draftsman for the ECW. Actual construction will be in charge of M. P. Greaves, superintendent of DG camp 27 at Castle Dale, and K. D. Williams and Omer Freeman, grazing division engineers. [23]

A few months later, the Emery County Express reported that work was progressing despite a problem the CCC workers had in getting materials to the site due to bad roads. The road was still under construction by other enrollees and was not due to be completed for another two years. The article went on to say:

> The actual construction work on this project is being done by Mr. Pearce of Spanish Fork, bridge contractor; Allen Lowry of Castle Dale, foreman in charge of the enrolled men working on the project and the forty-man side camp located in Buckhorn Wash; and Alvin Jensen of Castle Dale, mechanic in charge of the machinery used on the project. [24]

Unlike most government agencies, the CCC was an organization which used every available resource to complete its assigned tasks. The San Rafael Bridge project was no exception. Other CCC crews contributed to the construction of the road and bridge by supplying materials for its construction. Another newspaper article of the time illustrates this point as follows:

> David Tuttle has again resumed work in the Manti forest. The project calls for 15,000 board feet of lumber. The logging crew has felled timber and hauled about 70,000 board feet of lumber this year. This lumber was used for the building of culverts and bridges on the Buckhorn road, for planking on the suspension bridge over the San Rafael River and for the use of buildings at the spike camps. The logging crew consists of 15 men and is under the supervision of Foreman David Tuttle of Orangeville. [25]

By February 1937, the bridge portion of the project was complete. The Emery County Progress summed up the project as follows:

> The most outstanding accomplishment in the work program of the Department of Grazing by Co. 529 is the suspension bridge that spans the San Rafael River, 26 miles east of Castle Dale, on the Buckhorn Trail. This bridge required 250 man days to complete. The bridge has a 160 foot span from center to pier and is 14 ft. wide with four reinforced concrete piers 16 ft. high, with two steel suspension cables 2-1/2 inches in diameter that fasten to four solid concrete anchors sunken deep in the ground on either side. The bridge has a 16 foot wide, 1/4 mile approach from both sides. All the timber used in the construction of this suspension bridge was cut and hauled from the Manti forest by enrollee hand labor. The only work not done on this bridge by enrollees was done by one experienced bridge carpenter. In recent years bridges have been built across the ever shifting river with its quick sand beds, but the elements have torn them out. But this creation of the CCC labor is expected to break the spirit of the elements with its sturdy structure and open the vast grazing range to the stockmen in the future. [26]

On April 24, 1937, between 2000 to 3000 people attended the dedication of the bridge in Buckhorn Wash. In attendance were federal and state officials, Salt Lake City civic groups, CCC officials, as well as Governor Henry H. Flood and Samuel O. Bennion, representing the LDS Church. [27] the high school band played 'America,' followed by speeches with the main address coming from the governor. Following the speeches, a ribbon was cut and the bridge was officially opened to the public.

II. THE BRIDGE

A. Description

The bridge across the San Rafael River at the mouth of Buckhorn Wash is a single span double intersection warren suspension structure constructed of wood timbers held with steel vertical rods and suspended from concrete pylons by steel cables. The wood truss members consist of thirteen panels of double intersection Warren truss diagonal bracing with inclined end posts. The upper and lower chords are wood timbers that measure 8 inches square and 19 feet long, while the diagonal Warren members are 6-inch square timbers. The vertical rods each measure 6 feet high and the bridge measures 8 feet 2 inches high from the deck to the top of the upper chord. Total length of the bridge is 160 feet and the width is 12 feet 6 inches. The wood stringers which support the deck are 1 foot by 4 inches and the deck planks measure 1 foot by 2 inches. These stringers and planks are supported by steel "I" beams with wood timber lateral bracing.

The entire truss system is held up by two steel cables that run parallel to the trusses from two 16 foot concrete pylons that taper from a 6-foot square base to a 2 foot square top. The cables are approximately 1 inch in diameter and consist of six twisted bundles of wire strands. Each cable end is attached to a large "U" bolt which is passed through a large eye bolt. The eye bolt is anchored into a triangular concrete pad, which is 15 feet 6 inches long and 8 feet wide. The cable is attached to the bridge by steel rods, which are progressively shorter as the cable dips to the middle of the truss.

The concrete pylons are part of the cement abutments located on each end of the bridge. the south abutment is solid concrete, while the north abutment has stone masonry beneath the cement surface and between the bases of the pylons. The bridge truss system swings freely from the cables and is not attached to the abutments in any way. A steel expansion plate lies across the gap between the abutment and the trusses.

A railing of 2 inch by 6 inch boards runs the full length of the structure. This railing consists of two rails. The top of the upper rail is 3 feet 6 inches above the deck. The top of the lower rail is 2 feet 3 inches from the deck. A tire guard also runs the full length of the bridge. It consists of a 4 inch by 6 inch beam which is 4 inches above the deck surface.

B. Modification

The San Rafael Bridge has undergone only minor alterations over the years since its construction in 1937. The deck and stringers have deteriorated from the effects of weathering and thc weight of vehicular traffic. The substructure shows signs of this wear and replacement. Several older stringers are broken off at the ends and some appear to have been replaced. The deck appears newer and contains new bolts where the runners are fastened to the deck.

C. Ownership and Future

The San Rafael Swing Bridge is presently owned and maintained by Emery County. Plans call for the abandonment of the bridge in situ, due to structural decay. Another bridge will be constructed down strcam to replace the Swing Bridge and Emery County will continue to perform maintenance on thc original bridge.

IV. FOOTNOTES

[1] Hardy, Brian Clyde, The Historical Development of Wasatch Trails in Salt Lake County, p. 107.

[2] Baldridge, Kenneth W., "Reclamation Work of the Civilian Conservation Corps 1933-1942," p. 267.

[3] Ibid., p. 266.

[4] Pinkett, Harold T., "Records of Historic Thrust for Conservation," p. 80.

[5] The Historical Development of Wasatch Trails in Salt Lake County, p. 107.

[6] Ibid., p. 108.

[7] "Reclamation Work of the Civilian Conservation Corps 1933-1942," p. 267.

[8] Ibid., p. 267.

[9] Johnson, Charles W., "The Army and the Civilian Conservation Corps, 1933-1942," p. 139.

[10] Malmgren, Larry H., A History of the WPA in Utah, p. 15.

[11] Ibid., p. 16.

[12] "Reclamation Works of the Civilian Conservation Corps 1933-1942," p. 267.

[13] Ibid., p. 267.

[14] A History of the WPA in Utah, p. 114.

[15] "Reclamation Works of the Civilian Conservation Corps 1933-1942," p. 268.

[16] Ibid., p. 269.

[17] Baldridge, Kenneth W., Nine Years of Achievement: The Civilian Conservation Corps in Utah, p. 378.

[18] Emery County Progress, May 29, 1936.

[19] Ibid., May 29, 1936.

[20] Ibid., May 29, 1936.

[21] Ibid., June 19, 1936.

[22] Ibid., May 22, 1936.

[23] Ibid., May 29, 1936.

[24] Ibid., June 5, 1936.

[25] Ibid., October 16, 1936.

[26] Ibid., February 12, 1937.

[27] Ibid., April 30, 1937.

V. BIBLIOGRAPHY

A. Books

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Emery County, Emery County: 1880-1980, Emery County Historical Society; 1981.

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B. Periodicals

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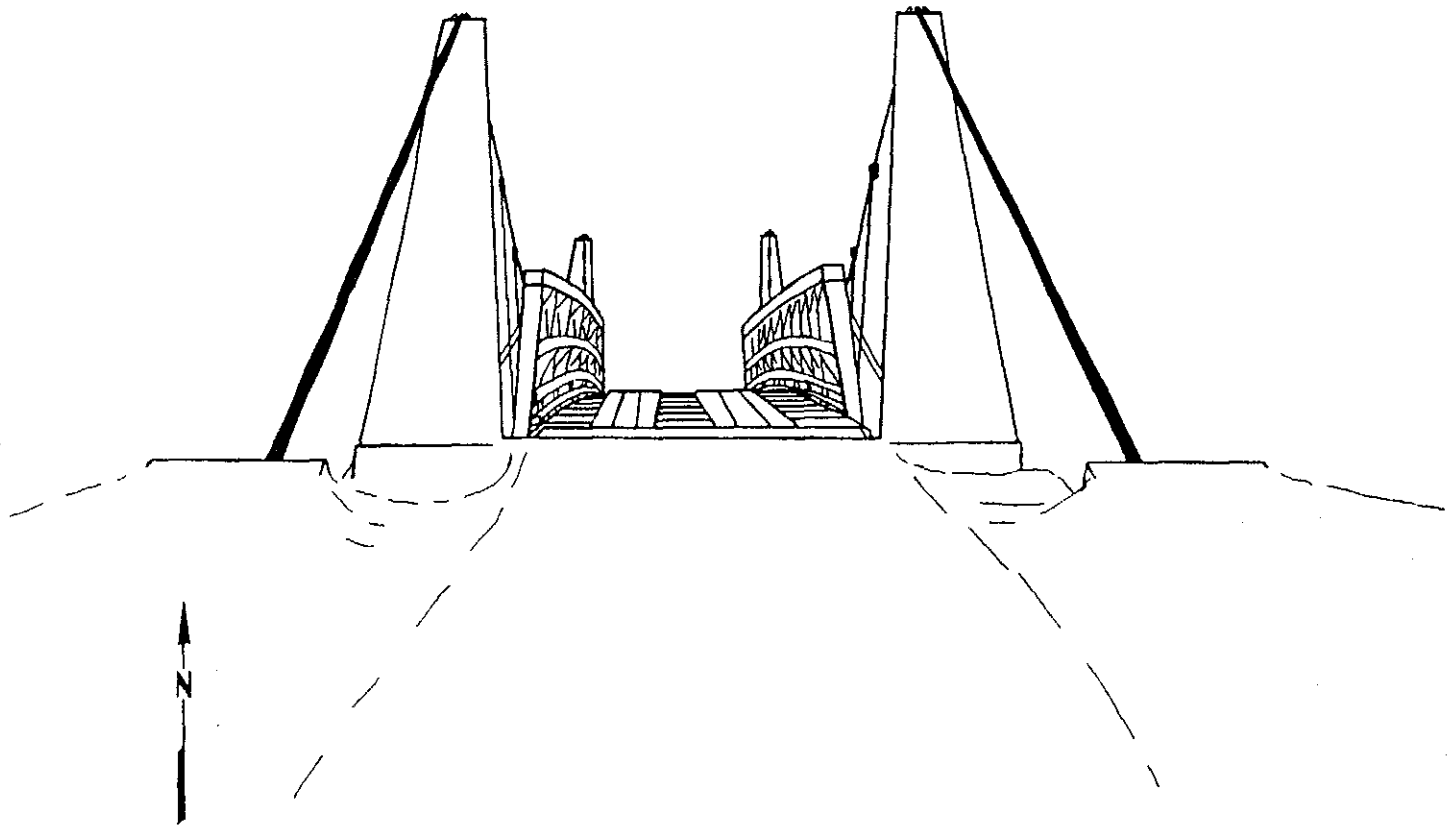
Pinkett, Harold T., "Records of Historic Thrust for Conservation," Prologue, The Journal of the National Archives, Summer 1976, Vol. 8, No. 2.

C. Newspapers

1. History

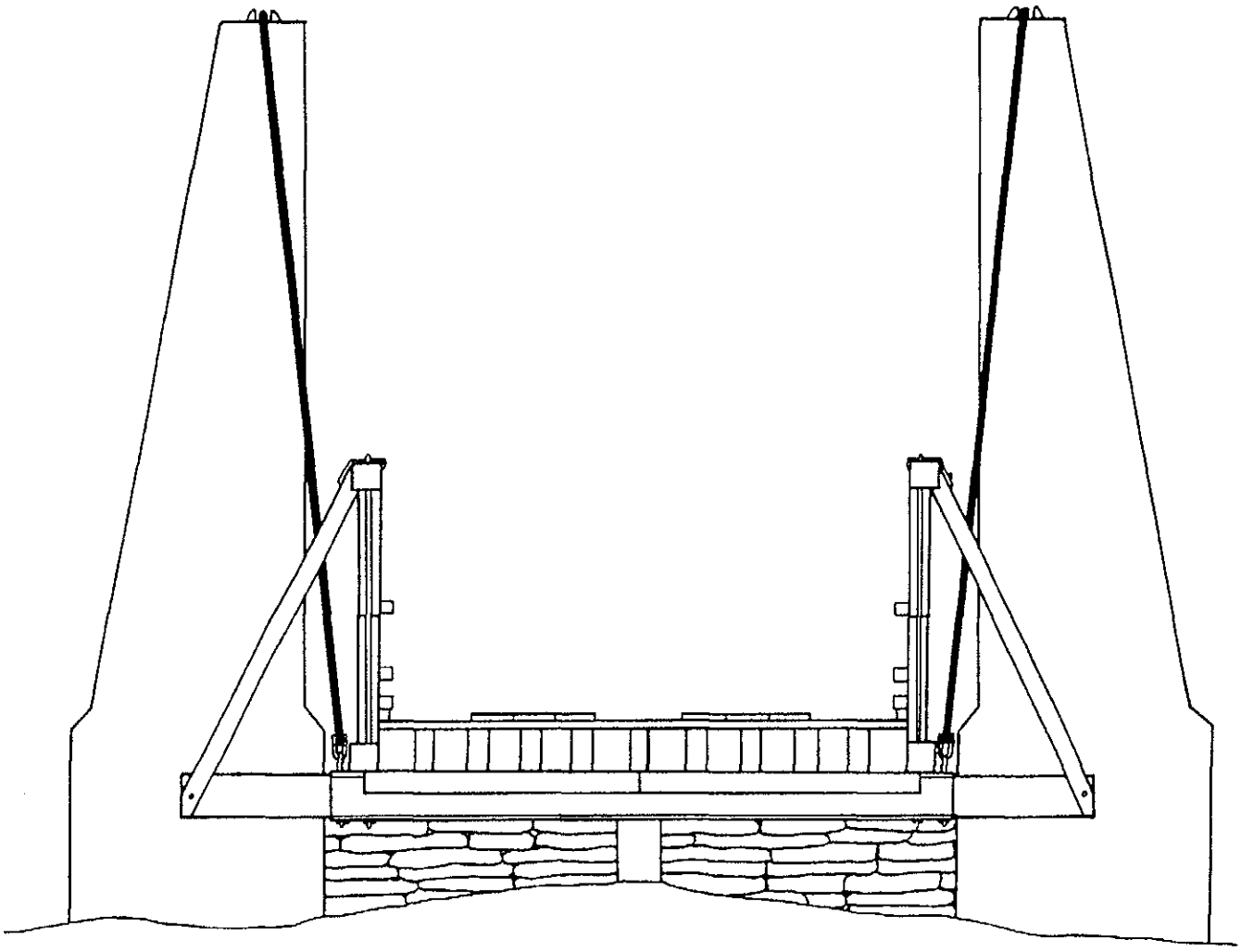
a. Construction Chronology

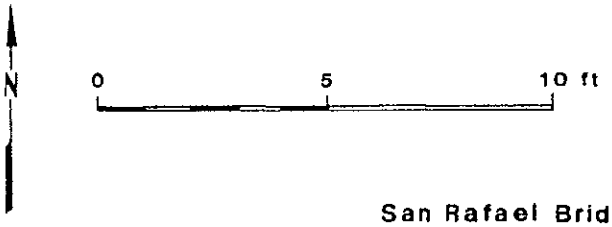
Emery County Progress, May 22, 1936.
_____, May 29, 1936.
_____, June 5, 1936.
_____, June 19, 1936.
_____, October 16, 1936.
_____, February 12, 1937.
_____, April 30, 1937.



San Rafael Bridge
HAER No. UT-60
South Approach

Office of Public Archaeology
Brigham Young University
Provo, Utah
13 Dec 1989





San Rafael Bridge
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Cross-section

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